The Environment—Our Natural Features & Resources

With development increasing regionally, residents of the City of Fairfax now place more importance on the natural environment. Preserving some land in its natural form, conserving open space throughout the city, and minimizing pollution have become priority concerns.

Natural Features—A Site Analysis

The planning, development and use of any place is strongly affected by the characteristics of the land, including the local geology, climate, soils, topography and streams. From the area's earliest settlements through the most recent development projects, these characteristics remain an important part of life in the City of Fairfax.

Geology

The City lies in the Piedmont Province underlain primarily by crystalline rock (see Appendix A). A thick layer of this rock beneath the topsoil is weathered into a fine clay-rich material. Bedrock levels vary from near the surface to 150 feet below the surface.

With the exception of areas underlain by mafic rocks in the western portion of the City and floodplains, most areas of the City are generally suitable for development purposes if the site is properly engineered. Developers must refer to the City's Department of Public Works for more information and recommended resources concerning the engineering capacity of the underlying geology.

Climate

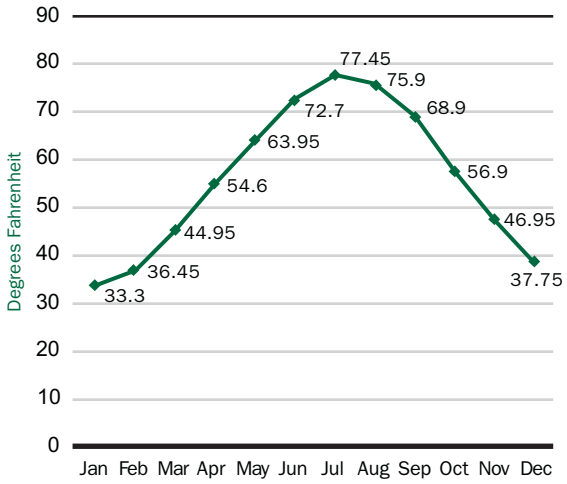
The City has a continental, humid, temperate climate. The average monthly temperature varies from 34.6 degrees in January to 80.0 degrees in July. Precipitation is generally ample and occurs mainly in the summer and spring. The temperature and precipitation monthly averages are shown in Figures ENV-1 and ENV-2.

Soils

According to the Soil Survey of Fairfax County, Virginia (1963), most of the City falls into the Fairfax-Beltsville-Glenelg and the Glenelg-Elioak-Manor soil associations. Most of the soils in the Fairfax-Beltsville-Glenelg association are well suited as material for home sites. With some exceptions, the soils of the

Figure ENV-1

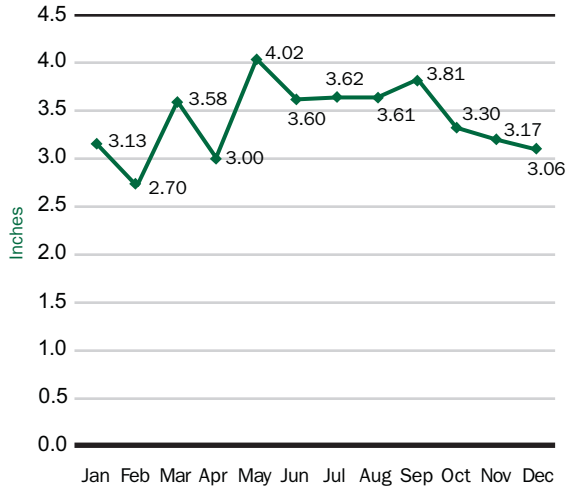
Average Monthly Temperature



Source: U.S. Census Bureau

Figure ENV-2

Average Monthly Precipitation



Source: U.S. Census Bureau

Glenelg-Elioak-Manor association are also well suited for urban development purposes. Much of the land within the City's floodplain falls into the Chewacla-Wehadkee association. These soils are poorly drained, subject to flooding, and not suitable for urban development.

A fourth association, the Orange-Bremo-Elbert, is found in the western portion of the City near Jermantown Road. Soils in the Orange series, which compose 65 percent of the association, are poorly drained with massive bedrock two to five feet below the surface. Because of the high shrink-swell potential and beds of hard rock found close to the surface, the construction of buildings and improvements on these soils is unusually difficult. The Soil Survey of Fairfax County, Virginia notes that the Orange soils are among the poorest materials in the County for housing developments. Another feature of the Orange series is the presence of asbestos. The asbestos is found in several forms, including the fibrous form, which, when airborne, can cause lung diseases. The presence of asbestos fibers in the air during construction can be a hazard to construction workers. This problem is mitigated with the replacement of topsoil following construction.

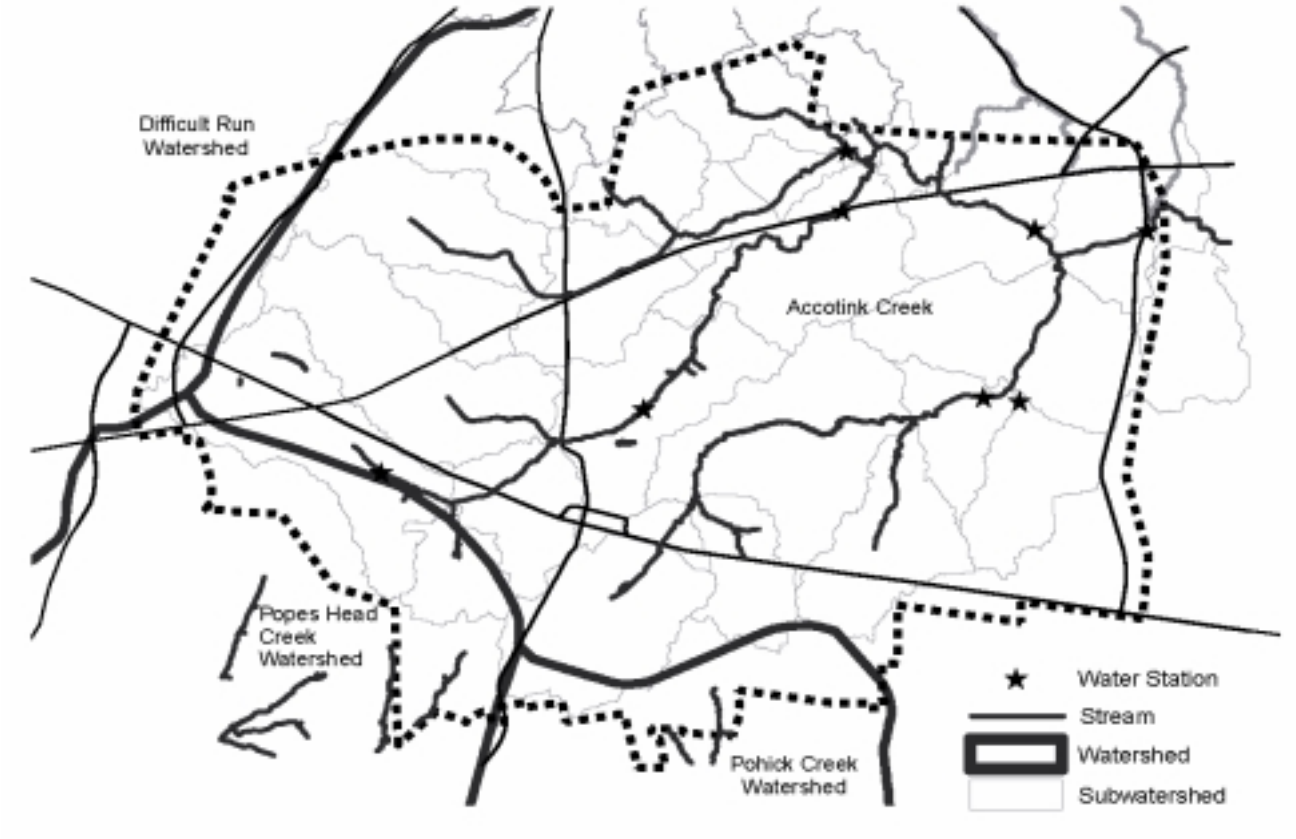
Topography

Any development or redevelopment within the City must take topographic constraints into consideration. Steep slopes in excess of 15 percent and slopes located along streams are susceptible to erosion and, therefore, particular care must be taken when planning to develop a site with these characteristics. In some instances, special engineering may be required to stabilize slopes. Where slopes in excess of 15 percent lie adjacent to Resource Management Areas, they may be protected under the City's Chesapeake Bay Preservation regulations. See Appendix A for detailed discussion of the City's Chesapeake Bay Preservation planning efforts, including legislation pending at the time of writing of this plan.

Only a very small portion of the City's land area has slopes of greater than 15 percent. These areas are primarily associated with reaches of Accotink Creek and Daniels Run and lie within the City-owned Van Dyck and Daniels Run Parks and in the Army Navy Country Club property.

Map ENV–1

Drainage Basins and Sample Stations



Major Streams and Watersheds

The City of Fairfax is located at the confluence of four major drainage divides and includes portions of the Accotink Creek, Pohick Creek, Pope's Head Creek, and Difficult Run watersheds (see Map ENV-1). As a unique consequence, practically all watercourses within the City (with the exception of a few tributaries to Accotink Creek in the northeastern portion of the City) originate within its boundaries and are not directly affected by activities from neighboring jurisdictions. This provides a considerable level of control to the City over the water quality of its streams. Major perennial streams that flow through the City include Accotink Creek (north and central forks) and Daniel's Run (also known as the south fork of Accotink Creek), all of which drain to Accotink Creek within the City. Many smaller tributaries drain to Accotink Creek and Daniel's Run in a roughly dendritic (branched) pattern that has been substantially modified by development and channelization.

Natural Resources— To Use and Protect

The City has several categories of natural resources that are easily impaired by urban land uses. Of particular concern are water quality, floodplain, woodlands, and wildlife. These are covered in separate subsections below. The most immediately impaired resources are agriculture and mineral extraction, because the appropriation of land for urban uses removes from availability the groups of lands suitable for agriculture or mineral extraction.

While small family vegetable gardens are scattered throughout the City of Fairfax, no large commercial agriculture operation is known to exist in the City. Recent history has shown that the number of—and reliance upon—family vegetable gardens increases with a downturn of the economy. Although this use of the City's natural resources may seem to bear little significance at the moment, the City should assure that the natural resources remain capable of supporting family gardening efforts throughout the City.

The City of Fairfax has prepared no survey of mineral deposits in the City; no commercially viable deposits are known to exist. The Virginia Department of Mines, Minerals and Energy prepares surveys of known mineral deposits, but offers no additional data on commercially viable mineral extraction available within the City.

Surface Water Quality

From the closing of the City's sewage treatment plant in 1972 until 1988, the City monitored stream water quality on a sporadic basis in response to specific complaints. To improve upon the situation, the City initiated a program in 1988 to regularly monitor stream water quality with the assistance of the Fairfax County Public Health Department. The County draws water samples from eight locations in the City all within the Accotink watershed (see Map ENV-1). Tests are performed to measure levels of fecal coliform bacteria, dissolved oxygen, nitrate nitrogen, pH and phosphorus.

Of these five criteria for stream water quality, only phosphorous has no established limit for content. However, variations in phosphorous content may help to determine possible trends in water contamination. Of the remaining four criteria, only fecal coliform bacteria consistently exceeds the VDEQ (Virginia Dept. of Environmental Quality) standard of 200 counts per 100 milliliters of surface water. In 1994, 89 percent of the samples collected exceeded the standard and since 1989, fecal coliform levels have steadily increased. The presence of this level of fecal coliform counts is not unusual for urban areas.

Among pollutants not monitored quantitatively by the City, sediment has a particularly adverse impact on water quality and storm drainage, responsible for many types of damage. Excessive quantities of sediment in a watercourse can lead to obstruction of stream channels, especially at man-made stream crossings, which reduces the stream's capacity to carry storm water. This, in turn, causes an increase in flood crests and a consequent rise in the frequency of damage from storm events. Since the City's streams act as the major components of the storm drainage system, damage caused by sedimentation also influences storm water management facilities, resulting in more costly repairs and maintenance. In addition to adversely affecting drainage systems, sedimentation also yields higher levels of nutrients and other pollutants, and reduces the oxygen content of surface waters, creating stress on aquatic life. Nearly all cities in large metropolitan areas have experienced similar effects of urbanization, requiring construction of storm water management facilities.

Floodplain

Floodplain is land along a natural drainage way that is subject to continuous or periodic inundation or flooding. For the purpose of protecting the general public from the hazards of flooding, the City of Fairfax, like most other jurisdictions, establishes and regulates an official 100-year floodplain. This specially designated area comprises lands with at least a one percent chance of being flooded in any given year. In the City of Fairfax the official 100-year floodplain is generally limited, for regulatory purposes, to floodplain lands associated with a watershed of at least 100 acres. The capacity of floodplain lands to filter and absorb runoff is limited by size, soil infiltration rates, vegetation type and amount, topography, and the amount of runoff. Development in and near floodplains can

substantially modify the natural area of the floodplain, changing the factors that contribute to its capacity. The increase in runoff associated with development in the floodplain adds to the frequency and levels of flooding and increases the risk of loss within adjacent areas.

Floodplains in the City lie principally alongside the Accotink Creek tributaries and consist of either natural land surface or impervious surfaces associated with development. City ordinances regulate development within the floodplain to protect the community from loss of life and property and to maintain the natural integrity of the streams. Having met the program requirement to adopt local ordinances limiting uses in the 100-year floodplain, the City participates in the National Flood Insurance Program (NFIP) through the Federal Emergency Management Agency (FEMA). The City's floodplain regulations were amended in 1993 to permit reasonable redevelopment of properties currently located in the floodplain and permit some active recreation uses and residential accessory structures if performance criteria are met. The regulations were further amended in 2003 to recognize updated floodplain delineation prepared by a consultant to the City and accepted by FEMA in 2002.

Tree Cover & Significant Woodlands

Because the City is almost entirely developed, few significant vegetation stands remain. Those that still exist, whether public or private, deserve specific attention so that their aesthetic and ecological benefits to the City are not lost. In addition to these stands, City streets are lined with trees planted and maintained by the Public Works Department. Street trees provide both the aesthetic benefits of a canopy and the framing of streets as well as a cooling of microclimates.

The largest City-owned vegetation stand is located in Daniels Run Park. The park covers 48 acres, most of which is in a natural state. It contains deciduous vegetation with an oak canopy and a beech understory. Other tree types found there are hickory, sycamore, tulip poplar and holly. The 20-acre Van Dyck Park is partially wooded, as is the 18-acre Ranger Road Park. Covering 17 acres, Providence Park has significant wooded areas, and contains many of these same tree types.

No large privately owned tracts of land in the City remain heavily wooded. The last two such tracts were the Farr property, located between Old Lee Highway and Main Street, developed between 1997 and 2002, and the Pickett's Reserve property, located east of Pickett Road, now under construction. The eastern portion of the 234-acre Army Navy Country Club along Pickett Road is also substantially wooded, despite recent golf course additions. The Country Club property is expected to remain as privately owned recreational land; however, no mechanism is in place to assure the retention of this open space.

For the protection of trees citywide, the City adopted a tree preservation ordinance in 1989 to ensure the proper planting and care of trees throughout the City, to preserve existing trees and tree stock, and to provide for appropriate screening and landscaping. The tree preservation regulations also address the removal of mature trees on public and private property within the City. The City may designate "special trees" (heritage, memorial, or specimen trees) and provide that such trees may not be removed or destroyed.

Although the development of property generally requires the removal of a proportion of the site's tree cover, it is often possible to designate areas of tree protection that may include clusters of trees or individual trees of significance. Developers should provide the appropriate measures for protecting clusters and individual trees throughout the development. Particular attention should be given to native species, such as yellow poplar, white oak, and southern red oak.

Saving mature trees to minimize net loss of tree cover as the City reaches build-out is important to the health of the City's urban forest. Where feasible, developers should seek to transplant trees that are removed during the development process. These trees should be transplanted on the development site or in public areas or rights-of-way, at the City's discretion. The goal is to preserve a mix of older and specimen trees along with planted or saved saplings to ensure an abundance of healthy and valuable trees. The City continues to pursue its ongoing program of planting street trees in medians of the arterial highways, as well as in available tree lawns in the rights-of-way of collector and local streets.

Four trees in the City have been identified by arborists as being noteworthy due to size, age, and significance of species. The most important is a 253-year-old white oak on Brookwood Drive. In 1987, this tree was officially commemorated as a U.S. Constitution Bicentennial tree in a program sponsored jointly by the National Arborist Association and the International Society of Arboriculture. The other noteworthy trees include a Southern Red Oak on Randolph Street, a Copper Beech on Main Street, and a White Oak at Farrcroft. The combination of poor air quality and unstable levels of groundwater have placed significantly more stress on the City's trees over recent years. Among the many trees lost to such stresses since 1997 were a large tulip poplar on Pickett Road and a large Basswood at the entrance to The Assembly on Chain Bridge Road. Many other trees were removed in association with the development of Farrcroft, Pickett's Reserve, Chancery Park and Providence Square. These included one large American elm at Farrcroft.

The City's concern for trees is reflected in its Arbor Day tree planting and community appearance activities, and its continuing designation as a Tree City by the National Arbor

Day Foundation each year since 1987. The City provides funding to plant new trees and shrubs in the City right-of-way on a continuing basis. The City on average obtains one small grant a year for various plantings. The City also seeks grants, on an ongoing basis, to supplement City funding of landscape planting and maintenance efforts.

Wildlife

Throughout the City of Fairfax, many of the native trees and shrubs have continued to thrive through two hundred years of increasingly intense use of the land. The tree canopies of many of the residential neighborhoods in the City support many species of birds and other animals. A walk down the trails along Daniels Run reveals even more variety of wildlife. Altogether, a wide variety of wildlife remains in the City. (For a list of species see Appendix A)

The variety of species that remain in the City is perhaps misleading. Much of the wildlife that once existed in the City no longer finds a habitat here. The varied requirements that are necessary to support all of the activities through the life cycle of many plants and animals native to the area are not currently supported by the City's environment. Many species are struggling to maintain a foothold against the pressures of invasive species and the pressures caused by nearby human activities.

Maintaining wildlife habitat in open space corridors throughout the City will help to preserve the diversity of life while providing animal species with more desirable alternatives than invading human living spaces. Through the development and maintenance of City properties and by working with developers and homeowners' associations, the City should encourage contiguous open space and the use of native plant materials while discouraging the use of invasive species.

Natural Ecosystems

The preservation of natural ecosystems ranks among the highest priorities of local, regional and global environmental needs. Because the City has very little land that has not been actively appropriated for human use in recent times, the small amount of natural area that remains is all the more important to the City. Over recent years the City has placed—and increased—restrictions on the use, construction and maintenance of Daniels Run Park. Based on recent piecemeal decisions, consideration should be given to formally designating this park as a nature preserve.

Human Habitats—Places to Live, Work and Visit

The City of Fairfax is home to its residents, workers, and students; it is also an important neighbor to many shoppers. The quality of our immediate environment affects many aspects of the everyday life of all who spend time in the City. Clean, safe and healthful surroundings are necessities for enjoying the high quality of life that we have come to expect in the City. We tend to take for granted the water that we drink and the air that we breathe. We are fortunate to have arrangements to dispose of our solid waste in locations outside of our City boundaries. We can, however, no longer ignore the degradation of our streams, the natural hazards of asbestos and radon, and the ever-increasing levels of noise in certain locations within the City.

Water Supply Protection

The City's water supply system consists of two water reservoirs (Beaverdam Creek and Goose Creek) and a water treatment plant on Goose Creek in Loudoun County. The treatment plant is linked to the City by a 25-mile transmission line that also serves part of eastern Loudoun County and parts of Fairfax County. A further description of the City's water utility is provided in the Public Facilities and Services section of this Plan.

Development pressure in eastern Loudoun County, due to the extension of the Dulles Toll Road from the rapidly expanding Dulles International Airport area to the Town of Leesburg, has resulted in a heightened interest in how to best protect the City's water supply. The completion of the 14.5-mile-long toll road has resulted in substantial urbanization of the eastern section of now largely rural Loudoun County. In response to this anticipated development, the Loudoun County Board of Supervisors and Planning Commission identified a need to formulate more specific land use policies to balance industrial, commercial, and residential land uses with the environmental, transportation, and public utilities infrastructure. In 1993, the County charged the Toll Road Plan Technical Committee (formed of representatives from the County, citizens groups, the Town of Leesburg, and local, regional, and State authorities) to develop a Toll Road Plan to make specific recommendations regarding land use along this corridor. The City reviewed and provided comment on the draft document. The Toll Road Plan was adopted June 21, 1995. It details specific policies to protect both the Beaverdam and Goose Creek reservoirs. The most significant of these policies is a required 300-foot vegetated buffer for the reservoirs.

Clean Water Act

The main objective of the federal Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." Nonpoint-source pollution is a major and extremely difficult problem, often starting far from the waters that are eventually contaminated. It begins when rainwater and melting snow run over the land and carry pollutants that may occur naturally or are caused by human effects on surface water or ground water. These pollutants are then concentrated in local drainage basins and transported to larger tributaries. The 1987 amendments to the federal Clean Water Act focused on controlling this type of pollution from diffuse sources.

With respect to local government land use regulations, two sections of the Clean Water Act are particularly important for controlling runoff from new development or redevelopment. Section 117 requires all states with tributaries flowing into the Chesapeake Bay to establish programs to protect the Bay's water quality. Virginia's Chesapeake Bay Preservation Act is a direct result of this federal requirement. In addition, Section 404 of the Clean Water Act requires a permit to be obtained from the Army Corps of Engineers for any dredging or filling of wetlands. This includes building roads and placing public utilities as well as private development.

Stream Restoration

Removal of forest cover and the development of land both increase runoff of storm waters into streams. In return, the increased flow and velocity of water within the streams causes stream bank erosion and siltation, undercutting stream banks, filling culverts with silt, and degrading the quality of stream waters. This process continues until the stream carves out for itself a new path that is more stable in handling the increased flows.

Two basic choices exist for responding to this problem. The City can either suffer through additional decades of degraded stream flow or reconstruct the stream in a more stable configuration. The City of Fairfax has planned, designed and constructed four miles of stream restoration projects for many of its streams over the past ten years. During this time, the City has amended its design standards for stream restoration in response to other environmental criteria. In the neighborhood of Daniels Run Park, the City has chosen to allow the stream to take the longer, more natural process of stabilizing itself. For purposes of enhancing our immediate environment, the City should continue to restore its streams. While pursuing this goal however, the concept of minimizing impact on other environmental features should always be kept in mind.

High levels of Coliform bacteria in the City's streams have consistently been identified as major problems with our water quality, leading the City to look at a broad list of possible sources with the intent to resolve the issue. Many other cities that have experienced this problem have found the source to be leaking sanitary sewers, combined storm and sanitary sewers or failing septic fields. In an effort to locate the sources of Coliform bacteria in the City's streams, the City has begun pursuing a program of dye-testing its sewer lines, particularly those that cross the City's streams, and lining or replacing any lines that appear to be leaking. The City is also lining or replacing its oldest sanitary sewers to assure that the City's sewer system does not develop leaks in the future. To date, the results of these programs have not suggested that sewer leaks are responsible for elevated levels of Coliform bacteria found in the City's streams.

Air Quality

Ambient air quality is not measured for the City alone but rather for the region as a whole. National Ambient Air Quality Standards (NAAQS) exist for seven pollutants established by the U.S. Environmental Protection Agency (EPA) and adopted by the Virginia State Air Pollution Control Board and the City of Fairfax in its Air Pollution Control Ordinance.

The air quality in the region is determined through measurement of seven pollutants. Existing levels of six of the seven pollutants, sulfur dioxide (SO_2), nitrogen dioxide (NO_2), hydrocarbons (HC), lead (Pb), carbon monoxide (CO) and suspended particulates, pose little or no threat to air quality in the region. Sulfur dioxides, nitrogen oxides, hydrocarbon and carbon monoxide are all a direct result of reactions caused by combustion engines. Lead as air pollution results primarily from the burning of leaded fuels. (The incidence of lead in the air dropped significantly since 1975 with the introduction of unleaded gasoline.) Suspended particulates consist of dust, smoke and other solid and liquid particles small enough to suspend readily in the air and are generated through industrial, incineration and construction point sources, as well as vehicle exhaust.

Ground-level ozone is a colorless gas formed by a chemical reaction between Volatile Organic Compounds (VOCs) and oxides of nitrogen in the presence of sunlight. The Washington Metropolitan region, based on the 1990 Clean Air Act, is classified as a "serious non-attainment area" with respect to ozone pollution. Since 1990, the region has violated the federal standard for ozone an average of six days each summer. The Metropolitan Washington Council of Governments (MWCOG) declares Air pollution alerts, particularly in response to accelerated ozone levels. These alerts are directed toward the young, the elderly, and those segments of the population with respiratory disorders.

Because many of these pollutants have a common source, vehicle exhaust, vehicle trip management and methods to reduce traffic congestion have been targeted in reducing pollutants.

The Clean Air Act Amendments (CAAA), adopted by Congress on November 15, 1990, call for integration of transportation, land use and air quality planning within individual jurisdictions and coordination of planning between jurisdictions. The City, as a member of MWCOG, integrates its planning efforts with regional planning efforts through membership on various subcommittees. Recommendations and information emanating from these subcommittees are then transferred to a separate committee, the Metropolitan Washington Air Quality Committee (MWAQC), which develops regional strategies to control ozone.

While local jurisdictions are cooperating to control ozone, the Commonwealth of Virginia is required to develop control strategies for regions with non-attainment status. The federally mandated State Implementation Plan (SIP) for the Northern Virginia region (to be reviewed by the EPA) includes more stringent vehicle emissions inspections, requires Stage II vapor recovery nozzles at gasoline pumps, and clean fleet standards for both public and private vehicle fleets. Failure to meet EPA approval for the SIP and its implementation could result in the loss of federal transportation funds for roads and highways.

The Intermodal Surface Transportation Efficiency Act (ISTEA) and legislation following it provide funding sources to state and local government for implementing measures to develop an economically efficient and environmentally sound national transportation system. As part of the coordinating responsibilities of ISTEA, the City encourages land use and transportation planning supportive of regional efforts to combat ozone pollution. The City-owned and operated CUE bus system, with service to and from the Vienna/Fairfax-GMU Metro station and George Mason University, is an important link in regional mass transit. The City bike and trail system is connected to county and regional trails providing further alternatives to automobile travel. Land use planning that provides higher densities along transit routes while preserving significant open space, mitigates congestion and provides easier access to mass transit.

Solid Waste Management

A balanced and integrated system of environmentally sound waste disposal is a major challenge. With the disposal of solid wastes in landfill sites becoming increasingly difficult and expensive, the City adopted a Solid Waste Management Plan in 1991, based on Virginia Department of Waste Management (DWM) guidelines, which promotes source reduction, reuse, and recycling of solid waste as the preferred methods of waste management.

The City maintains an aggressive recycling program, recycling as much as 50 percent of its residential waste through its curbside multi-material recycling program in single-family neighborhoods. The combined recycling rate for residential and commercial properties is 47 percent, as compared with DWM's recycling goal of 25 percent.

Asbestos

As discussed under the Soils heading of this section, the Orange soil series, found along the western boundary of the City, includes a fibrous form of asbestos. Areas containing soils of the Orange series should be carefully monitored to prevent asbestos fibers from becoming airborne. Monitoring is most needed during construction and maintenance operations; during all other times, ground cover should be in place to prevent wind and water from causing fibers to become airborne.

Radon

Radon is a colorless, odorless radioactive gas produced by the natural decay of uranium and radium in rocks and soils. Only recently have scientists discovered that significant amounts of radon can accumulate in buildings from underground rocks and soils. Research has shown a link between lung cancer and high levels of exposure to radon.

A 1988 study by the U.S. Geological Survey examined the rocks and soils in the City and rated their radon potential. Areas were rated on a scale of 1 (low) to 5 (high) based on the likelihood that the radon level exceeded 4 picocuries per liter (the EPA-designated level requiring remedial action).

In 1991-1992, the Commonwealth of Virginia, in conjunction with the EPA, conducted a residential radon survey for all the localities within the state. Of the 21 samples taken in the City, only two houses showed concentrations greater than the established limit of 4 picocuries per liter. The average concentration was 2.1 picocuries per liter with a maximum of 8.5.

To assist homeowners and residents, the Department of Community Development and Planning maintains a list of current EPA-approved contractors that measure radon contamination.

Noise

City residents are increasingly aware of noise as an unwanted intrusion. Noise in the City is primarily produced by surface vehicles and, to a lesser degree, by airplanes. Consequently, noise pollution is most concentrated along the City's main

roads and along Route 66. In response to requests from residents along the northern border of the City at Route 66, the Virginia Department of Transportation installed highway noise barriers roughly from Marilta Court to Plantation Parkway.

In addition, the City Code identifies noise-related regulations, which are enforced by the Police Department. Examples of noise violations include excessive volumes of radios, loudspeakers and voices as well as construction related or automotive noises. While incidents of loudspeakers and radios from stationary sources remain rare, complaints of traffic noise (particularly from trucks and motorcycles) have increased over recent years. Over the past several years the City has taken an active role in amending its noise ordinance and working with businesses to find ways to contain and minimize noises found to be particularly objectionable to neighbors in certain areas.

Abating Hazards and Preventing Pollution

Environmental pollution over the past 150 years has dramatically altered the local, regional and global environments. At all three scales, the solutions require local action. Only local action will serve to clean up the immediate environment of the City of Fairfax. Three particularly important issues are stream water quality, toxic substance spills, and leaking underground storage tanks.

Chesapeake Bay Preservation

The City adopted Chesapeake Bay Preservation regulations in late 1990 (revised in November 1991) to implement the Chesapeake Bay Preservation Act (CBPA). The Virginia General Assembly adopted the Act in 1989 (amended in November 1990) to protect and improve the water quality of the Chesapeake Bay, its tributaries and other state waters.

The City's Chesapeake Bay Preservation program was found "provisionally consistent" on August 21, 1991. Since that time, the City's Department of Community Development and Planning and Department of Public Works have cooperatively implemented these regulations.

As a requirement of provisional consistency, the Chesapeake Bay Local Assistance Board (CBLAB) resolved that suggested program modifications be completed as expeditiously as possible, and that the City revisit its Resource Management Area (RMA) designations in conjunction with review and revision to the City's Comprehensive Plan. In 1995, the City and the Chesapeake Bay Local Assistant Department (CBLAD) contracted with the Northern Virginia Planning District Commission (NVPDC) to prepare a report on Chesapeake Bay Preservation Areas for the Comprehensive Plan. The full text of the NVPDC report, including recommended refinements to the City's program, was included with the 1997 Comprehensive Plan as an Appendix.

Since 1997 the City's Chesapeake Bay Ordinance has been revised twice to increase the significance of the program to the restoration of the Chesapeake Bay. Another revision is pending. In order that the City's water quality regulations benefit not only quality of the waters reaching the Chesapeake Bay, but also to benefit the City's own streams, the City should consider placing particular emphasis on removal of toxins, hydrocarbons, and heavy metals from parking lot runoff, as well as reducing erosion and siltation, while promoting infiltration, continuous stream flow, and elimination of barriers to flow.

Storm Water Management

The purpose of storm water management is to reduce the adverse effects of storm water and enhance water quality. The City's storm water management system is composed of natural drainage ways (streams, creeks and ditches) and man-made structures (storm drains, paved channels) in both public and private ownership. The man-made structures minimize the negative effects of land development such as flooding and erosion.

Erosion of stream channels is a natural process. However, changes in flow rates resulting from urban development have accelerated this process in the Accotink Creek basin, and the resulting streambed erosion is endangering the stability of sanitary sewer pipes crossing under streams in the City. Deposition of this eroded material endangers the flood control capabilities of the storm water management system.

Revised in 1992, the City's erosion and sediment control regulations address the prevention of soil erosion into the City's tributaries during construction. These regulations prevent the degradation of properties, stream channels, waters, and other natural resources by providing that adequate soil erosion and sediment control measures are taken before, during, and after development. The City's Erosion and Sediment Control regulations implement the Virginia Erosion and Sediment Control Law (§10.1-560 et seq., Code of Virginia (1950)) as well as the Chesapeake Bay Preservation Act. Land owners proposing land disturbing activity of greater than 2,500 square feet must take steps to ensure that sediment associated with development does not leave the site. This is accomplished through the installation of silt fences, sediment traps, and similar structures.

In 1993 the City contracted for the Storm Water Systems Capital Needs Study to address its storm water management needs. Through the extensive use of field surveys, the study

identified problems associated with the City's storm drainage system and made recommendations for the management of these problems in the form of projects to be included in the City's Capital Improvements Program. The study made recommendations for 14 specific projects including detention ponds, underground detention systems, permanent sediment traps, check dams and flow control weirs, channelization, rip rap, and bioengineered armoring. In addition to the 14 structural projects cited in the report, additional recommendations were made concerning computerized stream flow management, water quality inlets, pilot projects, and on-site detention design criteria.

Portions of these projects are being funded through the two million dollar 1993 bond. The City's Storm water Capital Financing Task Force completed a study of additional funding alternatives and recommended a dedicated real estate tax with revenues set aside for major storm water system improvements and funding of minor projects through the City's Capital Improvement Program. For the 1996-1997 Budget year, the City Council approved a two-cent increase on real estate taxes to fund storm water system improvements. To complement public improvement efforts, the City seeks, through the development process, dedication of property and construction or fee-in-lieu of construction for designated storm water project areas which are located on private parcels that are being developed or redeveloped, and that cannot meet storm water management requirements on-site.

Environmental Hazard Abatement

The City has a Hazardous Material Emergency Response Plan (HMERP) that is prepared and updated annually by the Fairfax Joint Local Emergency Planning Commission (FJLEPC). The Commission, which is composed of emergency response officials from the City, Fairfax County, and the towns of Herndon and Vienna, annually submits a new response plan to be reviewed by the Virginia Emergency Response Council (VERC). The HMERP identifies Critical Hazard Facilities (CHFs), determines available emergency response resources on site, specifies evacuation plans and identifies emergency response procedures.

Within the City of Fairfax, the 1995 HMERP identifies two CHFs. The first is Verizon, which operates a telephone switching facility on the south side of Lee Highway west of the intersection of University Drive and Lee Highway. This relatively small facility has no prior incidents involving the release of hazardous materials. The second CHF is the petroleum bulk storage facilities located on Colonial Avenue in the Pickett Industrial Park (also known as "the tank farm"). This facility is composed of four commercial storage facilities (Amoco Oil Company, Old Dominion Terminal LLC, Citgo Petroleum Corporation, and Star Enterprise Sales Terminal) and an underground pipeline station operated by Colonial Pipeline. The bulk facilities store large quantities of gasoline, fuel oil, and jet fuel in above-ground storage tanks (ASTs) supplied through the pipeline. (Colonial also operates a pipeline from the "tank farm" to Dulles International Airport.) The products are dispensed to tank trucks through bottom-fed loading racks. Most of the ASTs are equipped with piping for the application of fire fighting foam in the event of a tank fire and all loading racks have automatic fire suppression systems in case a fire or explosion occurs during loading operations. The City's Fire and Rescue Department has developed an extensive plan to respond to and control any incident at the Pickett Road facility.

While no major accidents have occurred in the history of this facility, there have been several spills and detections of underground contamination. The largest such contamination, discovered in the fall of 1990, consisted of a large plume of hydrocarbons in the subsurface extending from the facility into a residential community east of Pickett Road in Fairfax County. As a result of this discovery, the United States Environmental Protection Agency (EPA) took full authority over the site remediation process. The first phase consisted of emergency response and containment. As of the beginning of 1993, the resultant plume had been stabilized and contained. Phase II, initiated in 1995, consisted of a Corrective Action Plan (CAP). Under the CAP, a series of pilot studies determined appropriate technology for remediation. As part of this phase, a Risk Assessment determined the acceptable levels of contamination to be attained. Phase II was completed in 1997. The final phase will apply the technology identified in phase II to remediate the site. It is expected that this phase will have a ten-year life cycle.

While the contaminated soil will never regain its original condition, this incident has served to create greater cooperation between the City and the bulk storage facilities. The City's Office of Code Administration supplements its annual inspection with an additional 25 hours per week of scheduled inspections at that site. Also, the facilities themselves have spent millions of dollars retrofitting the existing equipment to comply with more stringent AST standards initiated by the Virginia Department of Environmental Quality (DEQ).

Environmental Sustainability—What Can We Do?

Over the past few years, much planning attention has been focused on the issues of environmental sustainability. Both research efforts and available solutions fall into three logical categories of scale—local, regional and global. While the local scale is most applicable to the City's planning efforts, the regional and global also depend on local action. Following are lists of actions that the City can undertake to promote environmental sustainability:

At the ***Local*** scale:

- Preserve mature ecosystems, streams, stream buffers and forests
- Minimize impervious cover and input of hydrocarbons and toxins to streams
- Maximize tree canopy and infiltration of rain water
- Maintain stream flows and low summertime stream temperatures
- Minimize the cost of meeting environmental objectives

At the ***Regional*** scale:

- All local level actions
- Minimize input of phosphorus and nitrogen to streams

At the ***Global*** scale:

- Minimize transportation requirements
- Maximize heating and cooling efficiency of human habitats through site planning and architectural design
- Maximize global forest cover and tree cover

In addition to the activities listed above, the following local initiatives have been suggested to increase environmental awareness and to promote passive activities to protect the environment:

- A "Name that Stream" program to increase awareness and promote local ownership of our water resources
- An "Environmental Interpretation Trail" associated with Daniels Run in the area of Daniels Run Elementary School
- A program to increase tree cover in Public Open Space
- A program to increase tree cover in Homeowners' Open Space
- An Urban Wildlife Program
- A storm drain inlet labeling program to identify the stream accepting storm waters

The Environment— Goal, Objectives & Strategies

Goal: Enhance the quality of life through policies and programs that respect the natural environment and protect the City's citizens from environmental hazards.

Objective ENV-1 Encourage the preservation of tree canopy and other natural features.

Strategies

ENV-1.1 Continue to enforce and refine the City's regulations that require new development to preserve existing natural features to the extent practical.

Special protection is provided for trees, floodplains, and watersheds through zoning regulations. Although it is not possible to develop wooded property without removing trees, significant stands of trees should receive considerable attention in the development review process to ensure that all practical and reasonable attempts at preservation have been made. Through the review of development plans and in the process of negotiated rezoning, special use permit and special exception requests, the City can ensure that natural resources are protected.

ENV-1.2 Encourage planned development that maximizes the retention of natural features.

Conventional development often results in the destruction of a site's natural features. Sites are often completely denuded of tree cover, the topography is leveled, and streams are piped and covered. Planned developments, however, can be used to encourage buildings, roads and utilities to be arranged in clusters, resulting in the preservation of significant natural features.

ENV-1.3 Support efforts to create green spaces and tree cover throughout the City.

The City should extend its existing program of planting street trees in the street rights-of-way by planting additional trees on properties held by the City for open space purposes. These would include the rights-of-way originally acquired by the City for the possible future extension of streets, unused or excess land on properties that house specific City functions, and parkland. The City should acquire additional land and easements for the expansion of existing street rights-of-way to allow for tree-lined streets. This could be achieved through development proffers as well as through the establishment of a trust fund into which funds and donations may be placed for future acquisition. The City should continue to seek alternative funding sources for tree plantings and emphasize the use of native species.

ENV-1.4 Support the recognition and preservation of historic and significant tree specimens.

The City should designate special trees for preservation and protection. Preservation of significant specimens on private property should be done in cooperation with the property owner and include provisions for routine maintenance. The City should also institute a Champion Tree program for the recognition of the largest tree of a species within the City. Such a program could be operated with the help of interested volunteers or students and be part of an educational effort on tree preservation.

ENV-1.5 Preserve stream corridors in a natural state.

Land located along streams that serves to provide a substantial habitat for wildlife, mitigates the impact of floods, or serves as a recreational area should be retained and restored (where necessary) to the extent possible. Where appropriate, such areas may be considered for future improvements to the City's storm water management system and recreational facilities.

ENV-1.6 Encourage and support a system of trails that links City residents to open space areas.

Through the local development review process, use of trust funds and grants, regional cooperation and strong public leadership, the City should continue to seek completion and maintenance of an integrated citywide trail system.

Objective ENV-2 Protect air and water quality by preventing pollution and preserving natural resources.

Strategies

ENV-2.1 Assure that the City's water supply and surface water quality comply with all state and federal standards and requirements.

The City should continue to monitor development in eastern Loudoun County so that proper buffers and Best Management Practices (BMPs) will be utilized to protect the City's potable water supply reservoirs.

The City should enhance surface water quality by financing and implementing mitigation projects, and by identifying and mitigating those sources most likely to contribute to stream contamination. Mitigation projects should be carefully designed to minimize destruction of riparian habitat and vegetated stream banks.

ENV-2.2 Seek to improve the City's air quality through regional cooperation and the promotion of innovative technologies.

Although air quality is a regional problem, the City should strive to comply with State and Federal air quality standards by participating in land use strategies and regional initiatives aimed at reducing air pollutants in the Washington area. The City should promote the use of mass transit, walking, and biking by planning for higher densities and mixed-use development/redevelopment at the City's commercial centers and along transit routes and by providing for easy access to mass transit. Traffic signals should be carefully engineered to minimize wait times to help relieve traffic congestion.

ENV-2.3 Sponsor programs and demonstration projects to promote air and water quality and pollution prevention through wise maintenance of real estate.

The City should start a "Natural Lawnscaping Program" utilizing native plants to reduce water use and pollution from mowing and to enhance wildlife habitat, utilizing City properties to support demonstration projects. In developing City properties, apply building and site designs such as green roofs and rain gardens that reduce energy use while reducing runoff and pollution.

Objective ENV-3 Monitor and abate environmental hazards to the maximum extent possible.

Strategies

ENV-3.1 Provide assistance to citizens and businesses seeking to reduce radon and asbestos hazards in their homes or businesses.

The City should gather and disseminate information on radon and asbestos hazards to City residents and businesses by working closely with the Fairfax County Health Department. The City should also provide information to low income homeowners on potential sources of funding to assist them in reducing high radon levels in their homes.

ENV-3.2 Encourage the continued identification, testing and containment of potentially hazardous materials, and increase public awareness of these hazards.

The existence of leaking underground storage tanks (LUSTs) and the presence of bulk petroleum facilities makes it imperative for the City to work closely with property owners in mitigating environmental hazards. The City should continue its efforts with the Fairfax Joint Local Emergency Planning Commission (FJLEPC) in identifying the existence of hazardous materials within its borders. Also, the City should work closely with the Virginia Department of Environmental Quality (DEQ) in identifying and mitigating the hazards of LUSTs. Further, the City should pursue options for relocating the Tank Farm from the City.

The City should initiate a long-term environmental monitoring program and further develop the staff expertise necessary to address environmental issues.

Objective ENV-4 Protect the Chesapeake Bay and water resources of the City from the adverse effects of pollution, and improve water quality currently adversely affected by pollution.

Strategies

ENV-4.1 Use the provisions of the state's Chesapeake Bay Preservation statutes to require that development projects control runoff from impervious areas as far upstream as possible and utilize low impact development approach to reduce the input of pollutants to the City's stream system.

The Chesapeake Bay provisions of the state code allow the City to require removal of all types of pollutants from the waters entering the City's streams from development sites. Requirements for maintenance of storm wa-

Map ENV-2
Chesapeake Bay Watershed

ter facilities assure that pollutant removal continues throughout the life of the developed project. The City should require that public and private development projects be planned to minimize impervious cover. The City should continue to work with the Chesapeake Bay Local Assistance Board to refine City regulations, as necessary, to ensure full consistency with the requirements of the Chesapeake Bay Protection Act.

ENV-4.2 Carefully monitor the maintenance of soil erosion and sediment control practices during each construction project to assure that all devices continue to serve their purposes throughout the life of the project.

The soil erosion and sediment control provisions of the City's zoning ordinance require the installation of sediment control devices during all land disturbance activities. During construction, these devices often fail to perform their design functions. Only through careful monitoring and enforcement can the City be assured that the soil erosion and sediment control program is successful.

Objective ENV-5 Provide public education and encourage public involvement in environmental protection.

Strategies

ENV-5.1 Develop handbooks, brochures or workshops and otherwise encourage residents and business owners to become environmentally responsible.

The City currently distributes literature on recycling, tree planting, composting, hazardous waste disposal and similar environmental subjects through the Department of Public Works and the Community Relations Office. Composting demonstrations are offered to City residents, and the City's cable TV channel, CityScreen, advertises workshops and schedules information sessions on environmental concerns. The City should continue to develop additional educational tools to inform and involve the public in environmental protection. An emphasis on the concepts of sustainability and its local, regional and global components should be stressed in all educational efforts. In particular, the City should provide environmental interpretation trails and work with its schools to assure that local examples of environmental issues are worked into the curriculum.

The City should also develop an Environmental Quality Advisory Committee and appropriate staff capabilities in natural resources to serve as advocates for the City's environment. Both should work with existing groups such as Friends of Daniels Run Park to involve citizens in environmental activities through the creation of new programs such as a "Name that Stream" program, the creation of an environmental interpretation trail in Daniels Run Park, and labeling storm drain structures with the name of the stream receiving the storm waters.

ENV-5.2 Maximize the use of regional and local standing committees to advise Council and educate citizens on environmental protection.

The City has established various committees and ad hoc groups to advise Council and educate citizens on specific local environmental matters. In addition, the City is represented on committees of regional organizations such as the Metropolitan Washington Council of Governments and the Northern Virginia Planning District Commission, and benefits from planning and implementation activities of statewide organizations such as the Chesapeake Bay Local Assistance Board. Efforts to protect and improve the environment are generally coordinated at the regional level where policies and programs that transcend jurisdictional boundaries and that impact neighboring jurisdictions are addressed.

ENV-5.3 Refine the City's excellent recycling program to expand materials collected and use additional recycled materials.

As technological advancements in recycling occur, the City should take advantage of economically sound opportunities to expand the materials collected from City offices and residences for recycling.

The City purchases recycled materials, including office paper, for governmental use. The City Code allows recycled paper and paper products a price preference of up to 10 percent over non-recycled paper and paper products. As new, quality products become available that are cost-competitive, the City should seek to incorporate additional recycled goods in its procurements.

Objective ENV-6 Preserve natural areas and provide trail linkages to open spaces and natural areas.

Strategies

ENV-6.1 Identify important lands that should be preserved in a natural state; establish a program to preserve these lands by acquiring fee simple ownership or conservation easements, as appropriate.

Beginning with Daniels Run Park, the City should formally establish open space preservation areas where the land will be left in a "natural" condition and where access and use of the land is limited.

ENV-6.2 Identify lands that contain important resources that should be conserved; establish a program to conserve these lands by acquiring conservation easements.

With the development and redevelopment of property along the City's streams, the City's Chesapeake Bay Preservation requirements assure that streams and adjacent buffers are protected during construction. These are not well protected after construction, and lands that were developed before the City initially adopted the Chesapeake Bay Preservation requirements are protected only from redevelopment. Some of these areas contain particularly important resources that could be protected through the acquisition of conservation easements.

ENV-6.3 Provide access to open spaces and natural areas by constructing trails and making trail connections as appropriate to the intended use of the land.

Locates all appropriate trail connections necessary to allow access to the City's important open spaces and natural areas; fund the construction of important trail connections through the development proffer system, where applicable. Limit access to preservation areas.

Objective ENV-7 Protect and enhance the City's wildlife habitat to the extent that it is compatible with human and nearby urban conditions.

Strategy

ENV-7.1 Prepare an urban wildlife management plan describing appropriate steps that the City, its businesses and its residents should take to manage wildlife.

In cooperation with local naturalists, the City should undertake a study of the existing wildlife within the boundaries of the City and identify measures that the City can take to assure protection of the City's wildlife while protecting residents from the effects of pestilent populations. This study should identify steps to take during construction of projects adjacent to natural areas and important considerations for ongoing maintenance of properties throughout the City.